



**Texas State Soil and Water Conservation Board  
 Clean Water Act §319(h) Nonpoint Source Grant Program  
 FY 2015 Workplan 15-07**

SUMMARY PAGE						
Title of Project	Addressing Agricultural NPS Pollution in the Arroyo Colorado Watershed through Continuing Education of Best Management Practices					
Project Goals	<ul style="list-style-type: none"> <li>• Develop materials needed to educate agricultural producers focused on technical and financial information of BMPs</li> <li>• Deliver a focused education program on irrigation techniques and specifics to agricultural producers to increase adoption of BMPs</li> <li>• Educate agricultural producers on the economics of and various incentive programs available to help pay for BMPs</li> <li>• Host field tours and demonstrations for agricultural producers to observe the effects of BMPs</li> <li>• Increase the number of producers that participate in incentive programs and install BMPs</li> <li>• Successfully host a soil testing campaign to encourage the reduction of fertilizer application</li> </ul>					
Project Tasks	(1) Project Administration; (2) Encourage the Utilization of and Continue Annual Soil Testing Campaign; (3) Conduct Education and Outreach to Increase Landowner Participation in Incentive Programs					
Measures of Success	<ul style="list-style-type: none"> <li>• Developed educational materials on specifications of BMPs</li> <li>• Education of agricultural producers</li> <li>• Increased participation in incentive programs or increased adoption of BMPs</li> </ul>					
Project Type	Implementation ( ); Education (X); Planning ( ); Assessment ( ); Groundwater ( )					
Status of Waterbody on 2012 Texas Integrated Report	<u>Segment ID</u>	<u>Parameter of Impairment or Concern</u>		<u>Category</u>		
	2201 (Arroyo Colorado Tidal)	Bacteria		5c		
		DDE in edible tissue		5c		
		Depressed dissolved oxygen		5c		
		Mercury in edible tissue		5c		
		PCBs in edible tissue		5a		
	2201B (Unnamed drainage tributary)	Bacteria		5b		
	2202 (Arroyo Colorado Above Tidal)	Bacteria		5b		
		Mercury in edible tissue		5c		
		PCBs in edible tissue		5a		
Project Location (Statewide or Watershed and County)	Arroyo Colorado Watershed in Hidalgo, Cameron and Willacy Counties					
Key Project Activities	Hire Staff ( ); Surface Water Quality Monitoring ( ); Technical Assistance ( ); Education (X); Implementation (X); BMP Effectiveness Monitoring ( ); Demonstration (X); Planning ( ); Modeling ( ); Bacterial Source Tracking ( ); Other ( )					
2012 Texas NPS Management Program Reference	<ul style="list-style-type: none"> <li>• Component 1: LTGs 1, 2, 3, 5, 6,</li> <li>• Component 1: STG 2D, STG 3A, 3B, 3C, 3D, 3F</li> <li>• Component 2: E3</li> </ul>					
Project Costs	Federal	\$316,911	Non-Federal	\$209,747	Total	\$526,658

Project Management	• Texas Water Resources Institute
Project Period	November 1, 2015 – October 31, 2019

## Part I – Applicant Information

### Applicant

Project Lead	Lucas Gregory						
Title	Senior Research Scientist						
Organization	Texas A&M AgriLife Research, Texas Water Resources Institute						
E-mail Address	lfgregory@ag.tamu.edu						
Street Address	578 John Kimbrough Blvd, TAMU 2260						
City	College Station	County	Brazos	State	TX	Zip Code	77843
Telephone Number	979-845-7869			Fax Number	979-845-8554		

### Co-Applicant

Project Lead	Ruben Saldana						
Title	District Extension Administrator, South District 12						
Organization	Texas A&M AgriLife Extension Service						
E-mail Address	rjsaldana@ag.tamu.edu						
Street Address	2401 East Highway 83						
City	Weslaco	County	Hidalgo	State	TX	Zip Code	78596
Telephone Number	956-968-5581			Fax Number	956-968-5639		

### Project Partners

Names	Roles & Responsibilities
Texas State Soil and Water Conservation Board (TSSWCB)	Provide state oversight and management of all project activities and ensure coordination of activities with related projects and TCEQ.
Texas A&M AgriLife Research, Texas Water Resources Institute (TWRI)	Provide overall project coordination and administration, reporting, project education and outreach and coordination of education and outreach, develop educational materials, promote the participation in incentive programs
Texas A&M, Department of Biological and Agricultural Engineering	Work with TWRI in updating educational materials to make region specific and present during educational events, as appropriate
Texas A&M AgriLife, District 12 Research and Extension Center	Work with TWRI in updating educational materials to make region specific and present during educational events, as appropriate
Texas A&M AgriLife Extension, Department of Agricultural Economics	Work with TWRI in updating education materials, support the education programs and discuss the economics of BMPs as a primary driver for adoption.
Texas State Soil and Water Conservation Board, Harlingen Regional Office (HRO)	Work with and assist SWCDs in the development, implementation, and maintenance of WQMPs. Responsible for technical review and certification of WQMPs. Provide information to AgriLife Extension to coordinate related education programs and assist with demonstration field tour

Southmost Soil and Water Conservation District #319 and Hidalgo Soil and Water Conservation District #350 (SWCD)	Lead cost-share program and provide information to AgriLife Extension to coordinate related education programs and assist with demonstration field tour
--	---

**Part II – Project Information**

Project Type							
Surface Water	X	Groundwater					
Does the project implement recommendations made in (a) a completed WPP, (b) an adopted TMDL, (c) an approved I-Plan, (d) a Comprehensive Conservation and Management Plan developed under CWA §320, (e) the <i>Texas Coastal NPS Pollution Control Program</i> , or (f) the <i>Texas Groundwater Protection Strategy</i> ?				Yes	X	No	
If yes, identify the document.		<i>A Watershed Protection Plan for the Arroyo Colorado Phase I</i>					
If yes, identify the agency/group that developed and/or approved the document.		Arroyo Colorado Watershed Partnership facilitated by Texas Commission on Environmental Quality and Texas Sea Grant	Year Developed	2007			

Watershed Information				
Watershed or Aquifer Name(s)	Hydrologic Unit Code (12 Digit)	Segment ID	Category on 2010 IR	Size (Acres)
Lower Arroyo Colorado	121102080700	2201	5c 5c 5c 5c 5a	83,558 acres
Middle Arroyo Colorado	121102080600	2202	5b 5c 5a	105,412 acres
Upper Arroyo Colorado	121102080100	2202	5b 5c 5a	109,630 acres

<b>Water Quality Impairment</b>		
Describe all known causes (i.e., pollutants of concern) and sources (e.g., agricultural, silvicultural) of water quality impairments or concerns from any of the following sources: <i>2012 Texas Integrated Report</i> , Clean Rivers Program Basin Summary/Highlights Reports, or other documented sources.		
<b>Impairments</b>		
<b>SegID 2201: Arroyo Colorado Tidal: From the confluence with Laguna Madre in Cameron/Willacy County to a point 100 meters (110 yards) downstream of Cemetery Road south of Port Harlingen in Cameron County</b>		
<u>Parameter</u>	<u>Category</u>	<u>Year</u>
Bacteria	5c	2006
2201_03: From the confluence with an unnamed drainage ditch with NHD RC 12110108005353 at point N-97.53, W 26.31 to the confluence with Harding Ranch Ditch tributary		
2201_04: From the confluence with Harding Ranch Ditch tributary to just upstream of the City of Hondo Wastewater Discharge at point N-97.58359, W26.247186		
2201_05: From just upstream of the City of Hondo Wastewater Discharge at point N-97.58359, W26.247186 to the upstream end of the segment		
<u>Parameter</u>	<u>Category</u>	<u>Year</u>
DDE in edible tissue	5c	2010
2201_05: From just upstream of the City of Hondo Wastewater Discharge at point N-97.58359, W26.247186 to the upstream end of the segment		
<u>Parameter</u>	<u>Category</u>	<u>Year</u>
Depressed dissolved oxygen	5c	1996
2201_04: From the confluence with Harding Ranch Ditch tributary to just upstream of the City of Hondo Wastewater Discharge at point N-97.58359, W26.247186		
2201_05: From just upstream of the City of Hondo Wastewater Discharge at point N-97.58359, W26.247186 to the upstream end of the segment		
<u>Parameter</u>	<u>Category</u>	<u>Year</u>
Mercury in edible tissue	5c	2008
2201_05: From just upstream of the City of Hondo Wastewater Discharge at point N-97.58359, W26.247186 to the upstream end of the segment		
<u>Parameter</u>	<u>Category</u>	<u>Year</u>
PCBs in edible tissue	5a	2008

2201\_05: From just upstream of the City of Hondo Wastewater Discharge at point N-97.58359, W26.247186 to the upstream end of the segment

**SegID 2201B: Unnamed Drainage Ditch Tributary (B) in Cameron County Drainage District #3 (unclassified water body) From the confluence with the Arroyo Colorado in Cameron County in the Rio Hondo turning basin at -97.6, 26.196 decimal degrees to a point 17.6 km upstream at the FM 510 crossing.**

<u>Parameter</u>	<u>Category</u>	<u>Year</u>
Bacteria	5b	2010

2201B\_01: Entire Water Body

**SegID 2202: Arroyo Colorado Above Tidal: From a point 100 meters (110 yards) downstream of Cemetery Road south of Port Harlingen in Cameron County to FM 2062 in Hidalgo County**

<u>Parameter</u>	<u>Category</u>	<u>Year</u>
Bacteria	5b	1996

2202\_01: From the downstream end of segment to the confluence with Little Creek just upstream of State Loop 499.

2202\_02: From the confluence with Little Creek to the confluence with La Feria Main Canal just upstream of Dukes Highway.

2202\_03: From the confluence with La Feria Main Canal just upstream of Dukes Highway to the confluence with La Cruz Resaca just downstream of FM 907

2202\_04: From the confluence with La Cruz Resaca to the upper end of segment at FM 2062

<u>Parameter</u>	<u>Category</u>	<u>Year</u>
Mercury in edible tissue	5c	2008

2202\_01: From the downstream end of segment to the confluence with Little Creek just upstream of State Loop 499.

2202\_02: From the confluence with Little Creek to the confluence with La Feria Main Canal just upstream of Dukes Highway.

2202\_03: From the confluence with La Feria Main Canal just upstream of Dukes Highway to the confluence with La Cruz Resaca just downstream of FM 907

2202\_04: From the confluence with La Cruz Resaca to the upper end of segment at FM 2062

<u>Parameter</u>	<u>Category</u>	<u>Year</u>
PCBs in edible tissue	5a	2008

2202\_01: From the downstream end of segment to the confluence with Little Creek just upstream of State Loop 499.

2202\_02: From the confluence with Little Creek to the confluence with La Feria Main Canal just upstream of Dukes Highway.

2202\_03: From the confluence with La Feria Main Canal just upstream of Dukes Highway to the confluence with La Cruz Resaca just downstream of FM 907

2202\_04: From the confluence with La Cruz Resaca to the upper end of segment at FM 2062

**Concerns**

**Seg ID 2201: Arroyo Colorado Tidal: From confluence with Laguna Madre in Cameron/Willacy County to a point 100 meters (110 yards) downstream of Cemetery Road south of Port Harlingen in Cameron County**

<u>Parameter</u>	<u>Level of Concern</u>
bacteria	CN

2201\_01: From the downstream end of the segment to the confluence with San Vicente Drainage Ditch

2201\_02: From the confluence with San Vicente Drainage Ditch to the confluence with an unnamed drainage ditch with NHD RC 12110108005353 at point N-97.53, W 26.31

<u>Parameter</u>	<u>Level of Concern</u>
Chlorophyll-a	CS

2201\_01: From the downstream end of the segment to the confluence with San Vicente Drainage Ditch

2201\_02: From the confluence with San Vicente Drainage Ditch to the confluence with an unnamed drainage ditch with NHD RC 12110108005353 at point N-97.53, W 26.31

2201\_03: From the confluence with an unnamed drainage ditch with NHD RC 12110108005353 at point N-97.53, W 26.31 to the confluence with Harding Ranch Ditch tributary

2201\_04: From the confluence with Harding Ranch Ditch tributary to just upstream of the City of Hondo Wastewater Discharge at point N-97.58359, W26.247186

2201\_05: From just upstream of the City of Hondo Wastewater Discharge at point N-97.58359, W26.247186 to the upstream end of the segment

<u>Parameter</u>	<u>Level of Concern</u>
Depressed dissolved oxygen	CN

2201\_05: From just upstream of the City of Hondo Wastewater Discharge at point N-97.58359, W26.247186 to the upstream end of the segment

<u>Parameter</u>	<u>Level of Concern</u>
nitrate	CS

2201\_01: From the downstream end of the segment to the confluence with San Vicente Drainage Ditch

2201\_02: From the confluence with San Vicente Drainage Ditch to the confluence with an unnamed drainage ditch with NHD RC 12110108005353 at point N-97.53, W 26.31

2201\_03: From the confluence with an unnamed drainage ditch with NHD RC 12110108005353 at point N-97.53, W 26.31 to the confluence with Harding Ranch Ditch tributary

2201\_04: From the confluence with Harding Ranch Ditch tributary to just upstream of the City of Hondo Wastewater Discharge at point N-97.58359, W26.247186

2201\_05: From just upstream of the City of Hondo Wastewater Discharge at point N-97.58359, W26.247186 to the upstream end of the segment

<u>Parameter</u>	<u>Level of Concern</u>
orthophosphorus	CS

2201\_03: From the confluence with an unnamed drainage ditch with NHD RC 12110108005353 at point N-97.53, W 26.31 to the confluence with Harding Ranch Ditch tributary

2201\_04: From the confluence with Harding Ranch Ditch tributary to just upstream of the City of Hondo Wastewater Discharge at point N-97.58359, W26.247186

2201\_05: From just upstream of the City of Hondo Wastewater Discharge at point N-97.58359, W26.247186 to the upstream end of the segment

**SegID 2201A: Harding Ranch Drainage Ditch Tributary (A) to the Arroyo Colorado Tidal (unclassified water body)**

<u>Parameter</u>	<u>Level of Concern</u>
ammonia	CS

2201A\_01: Entire water body

**SegID 2201B: Unnamed Drainage Ditch Tributary (B) in Cameron County Drainage District #3 (unclassified water body)**

<u>Parameter</u>	<u>Level of Concern</u>
Chlorophyll-a	CS

2201B\_01: Entire Water Body

<u>Parameter</u>	<u>Level of Concern</u>
nitrate	CS

2201B\_01: Entire Water Body

**SegID 2202: Arroyo Colorado Above Tidal: From a point 100 meters (110 yards) downstream of Cemetery Road south of Port Harlingen in Cameron County to FM 2062 in Hidalgo County**

<u>Parameter</u>	<u>Level of Concern</u>
Chlorophyll-a	CS

2201\_01: From the downstream end of the segment to the confluence with San Vincente Drainage Ditch

2201\_02: From the confluence with San Vincente Drainage Ditch to the confluence with an unnamed drainage ditch with NHD RC 12110108005353 at point N-97.53, W 26.31

2201\_03: From the confluence with an unnamed drainage ditch with NHD RC 12110108005353 at point N-97.53, W 26.31 to the confluence with Harding Ranch Ditch tributary

2201\_04: From the confluence with Harding Ranch Ditch tributary to just upstream of the City of Hondo Wastewater Discharge at point N-97.58359, W26.247186

<u>Parameter</u>	<u>Level of Concern</u>
nitrate	CS

2201\_01: From the downstream end of the segment to the confluence with San Vincente Drainage Ditch

2201\_02: From the confluence with San Vincente Drainage Ditch to the confluence with an unnamed drainage ditch with NHD RC 12110108005353 at point N-97.53, W 26.31

2201\_03: From the confluence with an unnamed drainage ditch with NHD RC 12110108005353 at point N-97.53, W 26.31 to the confluence with Harding Ranch Ditch tributary

2201\_04: From the confluence with Harding Ranch Ditch tributary to just upstream of the City of Hondo Wastewater Discharge at point N-97.58359, W26.247186

<u>Parameter</u>	<u>Level of Concern</u>
orthophosphorus	CS

2201\_01: From the downstream end of the segment to the confluence with San Vincente Drainage Ditch

2201\_02: From the confluence with San Vincente Drainage Ditch to the confluence with an unnamed drainage ditch with NHD RC 12110108005353 at point N-97.53, W 26.31

2201\_03: From the confluence with an unnamed drainage ditch with NHD RC 12110108005353 at point N-97.53, W 26.31 to the confluence with Harding Ranch Ditch tributary

2201\_04: From the confluence with Harding Ranch Ditch tributary to just upstream of the City of Hondo Wastewater Discharge at point N-97.58359, W26.247186

<u>Parameter</u>	<u>Level of Concern</u>
Total phosphorus	CS

2201\_01: From the downstream end of the segment to the confluence with San Vincente Drainage Ditch

2201\_02: From the confluence with San Vincente Drainage Ditch to the confluence with an unnamed drainage ditch with NHD RC 12110108005353 at point N-97.53, W 26.31

2201\_03: From the confluence with an unnamed drainage ditch with NHD RC 12110108005353 at point N-97.53, W 26.31 to the confluence with Harding Ranch Ditch tributary



2201\_04: From the confluence with Harding Ranch Ditch tributary to just upstream of the City of Hondo Wastewater Discharge at point N-97.58359, W26.247186

## Project Narrative

### Problem/Need Statement

The Arroyo Colorado is located in Cameron, Hidalgo, and Willacy counties in the Lower Rio Grande Valley of South Texas. The Arroyo Colorado flows approximately 90 miles from east of McAllen, transecting Hidalgo and Cameron counties and forming the boundary for Cameron and Willacy counties for the last 16 miles until it reaches the Lower Laguna Madre. To the Lower Laguna Madre, the Arroyo Colorado is the primary source of fresh water and serves as a nursery for aquatic life. The land that drains into the Arroyo Colorado is known as the Arroyo Colorado Watershed which is approximately 706 square miles comprising of various land uses. Those land uses have been classified by the Spatial Sciences Lab of Texas A&M University at College Station. Primary land uses include agriculture (54%), range (18.5%), urban (12%), water bodies (6%) and sugarcane (4%) (Kannan, 2012); however, vegetable and fruit crops are grown in portions of the watershed and some industry exists. Two of the primary users of water in the watershed are agriculture and municipalities and flow in the Arroyo Colorado is primarily sustained by wastewater discharges and agricultural irrigation return flows; thus, the Arroyo Colorado serves as a conveyer of this water as it leaves the system. When wastewater discharges and agricultural return flows enter the Arroyo Colorado, they carry nutrients, sediment and bacteria into the water body, causing threat to its various users of the water.

The tidal segment of the Arroyo Colorado was first listed as having low levels of dissolved oxygen in 1996 and elevated levels of bacteria in 2006 (Texas Commission on Environmental Quality, 2013) while the above tidal segment was listed in 1996 for having elevated levels of bacteria. To address the initial impairment of low dissolved oxygen, the Arroyo Colorado Agricultural Issues Workgroup, made up of local, state, and federal stakeholders, recommended that education and outreach be one of the priorities for implementation. Since then, several projects have occurred such as an integrated farm management program, pesticide education program, and cost-share education program and have been effective in raising awareness about water quality; however, the Arroyo Colorado Watershed Partnership has still not met its goal of 150,000 irrigated acres under conservation programs. To address this, an education program is needed to 1) continue raising awareness, and 2) provide technical education so that people understand the practices they need to adopt. Recent evaluation results also support these needs.

In a recent evaluation assessing educational needs of agricultural producers in the Lower Rio Grande Valley of Texas, results indicated that water quantity was the primary educational need. Specifically, agricultural producers indicated that they are interested in the amount of irrigation water available for the upcoming year and specific conservation practices that reduce the amount of irrigation water used. This second need is especially important in improving water quality as Enciso (2012) found that the excessive tailwater during irrigation events can contain the highest amount of nutrients contributing to local impairments. Next, agricultural producers were generally interested in water quality. Two educational needs questions that producers agreed with the most, related to water quality, were how water quality impacts your operation and what current water quality levels are. Thirdly, financial incentives were the next highest area that producers were interested in. How to apply for financial incentives and sources of financial incentives available to help pay for conservation practices ranked amongst the highest in the construct. Finally, respondents to the evaluation agreed the most to how I can improve my operation by adopting conservation practices and updates on conservation practice effectiveness the most, related to conservation practice educational needs. Addressing these educational needs is crucial to gaining widespread adoption of agricultural management practices.

A second component of the above evaluation was to assess the barriers to adopting management practices by agricultural producers in the Lower Rio Grande Valley. Results indicated that economic barriers were the primary

reasons for non-adoption. Specifically, respondents indicated that the initial cost of installing and low incentive levels were the primary economic reasons. Secondly, information and education was the next highest barrier to adopting practices. The lack of information about conservation practice effectiveness and the lack of opportunities to see practices at demonstrations were the highest priorities of the construct, followed closely by the lack of educational opportunities about conservation practices and not knowing about incentive programs. These results indicate that there is a need for educational programs that will address the primary barriers to adopting practices. Supporting these barriers in the literature, Nowak (1992) described two reasons for non-adoption; 1) being unable to adopt and 2) being unwilling to adopt. In the first reason, he describes that information is lacking or scarce, the availability and accessibility or supporting resources is limited which are directly tied to education. In his second reason, he says that limitation is related conflicting information, poor applicability and relevance of information which are also related to education. Rogers (2003) also supports this by providing the needed components of innovations, which are: relative advantage, compatibility, complexity, observability, and trialability. Educators are not able to meet the component of trailability; however, the other four can be provided. Recent education programs have been unable to provide the first three components to producers and as a result, the amount of interest in adopting management practices has not met the goals of the Arroyo Colorado Partnership. It is the goal of this project to deliver the most relevant information to agricultural producers and equip them with the technical information needed to adopt best management practices, especially through incentive programs.

#### References:

- Kannan, N. Texas Water Resources Institute, (2012). *Swat modeling of the arroyo colorado watershed* (Technical Report 426). Retrieved from website:  
<http://twri.tamu.edu/reports/2012/tr426.pdf>
- Nowak, P. (1992). Why farmers adopt production technology Overcoming impediments to adoption of crop residue management techniques will be crucial to implementation of conservation compliance plans. *Journal of Soil and Water Conservation*, 47(1), 14-16.
- Rogers, E. M. (2003). *Diffusion of Innovations*. New York, NY: Free Press.
- Texas Commission on Environmental Quality. (2013, February 13). *Draft 2012 Texas integrated report - Texas 303(d) list (category 5)*. Retrieved from  
[http://www.tceq.texas.gov/assets/public/waterquality/swqm/assess/12twqi/2012\\_303d.pdf](http://www.tceq.texas.gov/assets/public/waterquality/swqm/assess/12twqi/2012_303d.pdf)

## Project Narrative

### General Project Description (Include Project Location Map)

The primary focus of this project is to continue efforts from TSSWCB 10-11, but enhance the education program delivery and provide more specific, technical and financial information that will address both nutrient and bacteria induced impairments. This project compliments ongoing partnership efforts of implementing the Arroyo Colorado Watershed Protection Plan but addresses the need of educating the agricultural community, a gap existing within other current projects.

First, a soil testing campaign will be held that will offer producers free soil testing. The soil testing campaign will be advertised through direct mailings and the airing of a previously developed Public Service Announcement. The Extension Assistant will be available to assist with interpreting soil testing results when assistance is requested. An educational event will be held to kick off the soil testing campaign; the event will focus on the importance of soil health's role in nutrient management and water quality.

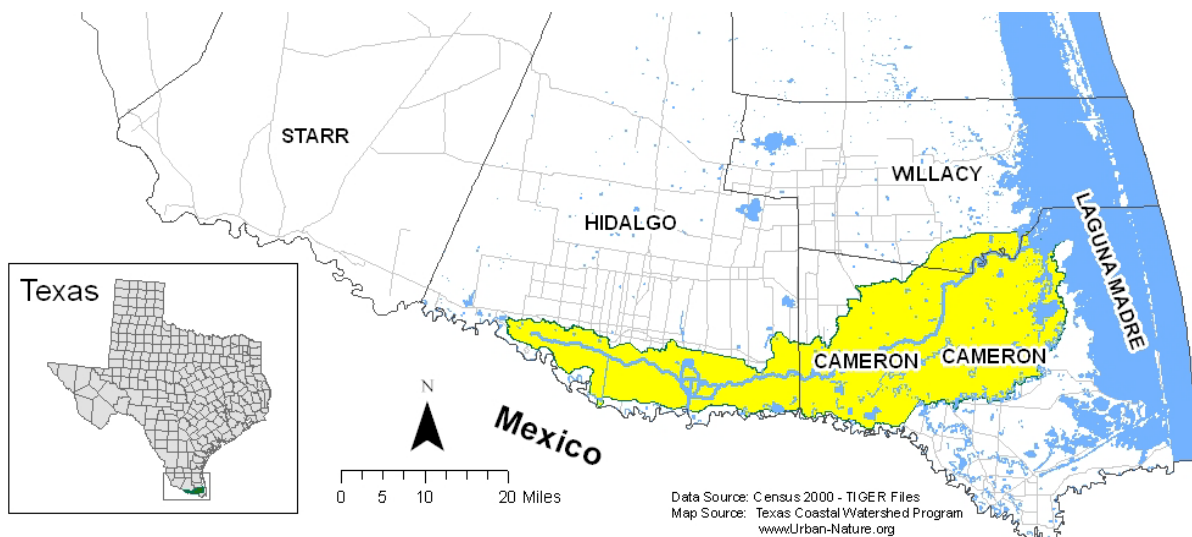
In this project, a producer mailing list will be developed and enhanced so contact with additional producers can be made. The Extension Assistant will then use this mailing list for direct mailings to producers that will be geared toward

highlighting the availability of and involvement in incentive programs. Additionally, the Extension Assistant will provide news releases and direct mailings about upcoming educational opportunities. Direct contact will be made through personal contact and meetings with key stakeholders, as identified by other individuals. Finally, the Extension Assistant will attend SWCD meetings twice annually to provide them with information about the program.

In recent projects, bacteria have not been a primary focus of educational efforts. Under this project, the Extension Assistant will develop and distribute additional information about technical and financial assistance for both nutrient and bacteria BMPs. Some of this information will need to be tailored to the Arroyo Colorado watershed.

The primary objective of this project is to educate agricultural producers in the Arroyo Colorado watershed. To do so, the Extension Assistant will coordinate an Irrigation Training Program that will be held annually and provide producers with technical information needed to make decisions about various BMPs including but not limited to irrigation scheduling using weather station data (solar radiation, wind speed, humidity, rainfall), irrigation application technology, soil moisture sensors, etc. Educational events will target various aspects of irrigation and materials will be provided to meeting participants. The Extension Assistant will host an annual meeting for producers that specifically promotes technical and financial assistance programs and highlights BMPs that can be adopted through those programs. Also, the Extension Assistant will host at least one field tour annually that will demonstrate the use of BMPs and their efficiency.

Finally, the Extension Assistant will continue to provide educational materials to various entities such as irrigation districts, drainage districts, and commodity organizations to encourage discussions among entities. The Extension Assistant will also participate in each of these entity meetings annually to discuss the project. The Extension Assistant will continue to support, promote, and participate in any field days, site tours, and education events as appropriate.



Tasks, Objectives and Schedules						
Task 1	Project Administration					
Costs	Federal	\$25,353	Non-Federal	\$16,780	Total	\$42,133
Objective	To effectively administer, coordinate and monitor all work performed under this project including technical and financial supervision and preparation of status reports.					
Subtask 1.1	TWRI will prepare electronic quarterly progress reports (QPRs) for submission to the TSSWCB. QPRs shall document all activities performed within a quarter and shall be submitted by the 15 <sup>th</sup> of January, April, July and October. QPRs shall be distributed to all Project Partners.					
	Start Date	Month 1		Completion Date	Month 48	
Subtask 1.2	TWRI will perform accounting functions for project funds and will submit appropriate Reimbursement Forms to TSSWCB at least quarterly.					
	Start Date	Month 1		Completion Date	Month 48	
Subtask 1.3	TWRI will host coordination meetings or conference calls, at least quarterly, with Project Partners to discuss project activities, project schedule, communication needs, deliverables, and other requirements. TWRI will develop lists of action items needed following each project coordination meeting and distribute to project personnel.					
	Start Date	Month 1		Completion Date	Month 48	
Subtask 1.4	TWRI will develop a Final Report that summarizes activities completed, conclusions reached during the project and discusses the extent to which project goals and measures of success have been achieved.					
	Start Date	Month 1		Completion Date	Month 48	
Deliverables	<ul style="list-style-type: none"> <li>• QPRs in electronic format</li> <li>• Reimbursement Forms and necessary documentation in hard copy format</li> <li>• Final Report in electronic and hard copy formats</li> </ul>					

Tasks, Objectives and Schedules						
Task 2	Encourage the Utilization of and Continue Annual Soil Testing Campaign					
Costs	Federal	\$19,015	Non-Federal	\$12,584	Total	\$31,599
Objective	To host and advertise for a soil testing campaign that will help producers meet requirements of various management practices and incentive programs.					
Subtask 2.1	To encourage the use of soil testing in support of nutrient management, AgriLife Extension will host a soil testing campaign for agricultural producers in Cameron, Hidalgo and Willacy counties. The soil testing campaign will be offered in the fall/winter of 2015, 2016, and 2017. Producers will be encouraged to soil test to determine nutrient application needs and AgriLife Extension will provide follow-up educational assistance to interpret soil test results.					
	This project will pay up to \$10 per soil test sample for up to 400 samples annually taken within the Arroyo Colorado watershed; this project will pay for all soil tests necessary to comply with soil testing frequencies consistent with the NRCS practice standard for Nutrient Management (590). Soil tests and shipping paid for with project funding must be completed by a public soil testing laboratory, such as the AgriLife Extension Soil, Water and Forage Testing Laboratory.					
	Start Date	Month 1		Completion Date	Month 48	
Subtask 2.2	Advertisement for the soil testing campaign will be conducted through direct mailings to producers identified in Subtask 3.1 and through the airing of a Soil Testing Public Service Announcement developed under a previous project. County Extension Agents will help promote the soil testing campaign within their respective counties through their educational programs and direct contact. Email and social media will also be utilized to help advertise the campaign.					
	Start Date	Month 1		Completion Date	Month 48	
Deliverables	<ul style="list-style-type: none"> <li>• Number of soil testing participants annually</li> <li>• Results of soil testing campaign samples</li> <li>• Airing schedule of Public Service Announcements</li> </ul>					

Tasks, Objectives and Schedules						
Task 3	Conduct Education and Outreach to Increase Landowner Participation in Incentive Programs					
Costs	Federal	\$272,543	Non-Federal	\$180,383	Total	\$452,926
Objective	To deliver educational materials and host educational events and field days as well as evaluate educational program effectiveness. Further, objectives are to contact landowners through direct mailings, direct contact and support and participate in entity meetings and other demonstrations.					
Subtask 3.1	The Extension Assistant will develop a mailing list of producers in the Arroyo Colorado Watershed and updated the mailing list as needed.					
	Start Date	Month 1		Completion Date	Month 48	
Subtask 3.2	The Extension Assistant will periodically distribute direct mailings to producers identified in Subtask 3.1. Direct mailings and personal contact will be geared towards highlighting the availability of and involvement in available incentive programs. Also, direct mailings and news releases will advertise upcoming educational opportunities. Further, AgriLife Extension will engage producers through personal contact. Direct contact will be made with individuals identified in Subtask 3.1 as well as attendance at SWCD meetings (twice annually at each SWCD).					
	Start Date	Month 1		Completion Date	Month 48	

Subtask 3.3	The Extension Assistant will use information in the USDA-NRCS Field Office Technical Guide to develop educational materials that highlight specifications, beyond descriptions, about various BMPs that are of interest to producers. The Extension Assistant will also work with AgriLife Extension Department of Agricultural Economics to incorporate information on the economics of BMPs as a primary driver for adoption. Materials will be distributed at the various educational events in the following subtasks. Also, materials that educate producers on technical and financial assistance will be updated and delivered at educational events to further encourage the adoption of BMPs through assistance programs.				
	<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:25%; text-align:center;">Start Date</td> <td style="width:25%; text-align:center;">Month 1</td> <td style="width:25%; text-align:center;">Completion Date</td> <td style="width:25%; text-align:center;">Month 48</td> </tr> </table>	Start Date	Month 1	Completion Date	Month 48
Start Date	Month 1	Completion Date	Month 48		
Subtask 3.4	<p>The Extension Assistant will coordinate an Irrigation Training Program that will be held once annually. This program will consist of specialists that will present on various topics including, but not limited to:</p> <ul style="list-style-type: none"> <li>• Economics of BMP adoption</li> <li>• Irrigation scheduling using local and regional weather data</li> <li>• Irrigation technologies and BMPs</li> <li>• Water quality issues</li> <li>• Crop-specific guidelines</li> </ul> <p>Materials will be printed and provided to participants.</p>				
	<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:25%; text-align:center;">Start Date</td> <td style="width:25%; text-align:center;">Month 1</td> <td style="width:25%; text-align:center;">Completion Date</td> <td style="width:25%; text-align:center;">Month 48</td> </tr> </table>	Start Date	Month 1	Completion Date	Month 48
Start Date	Month 1	Completion Date	Month 48		
Subtask 3.5	The Extension Assistant will coordinate with SWCDs, NRCS, HRO, and cooperating producers to host one educational meeting annually, specifically dedicated to promoting technical and financial assistance programs. The Extension Assistant will utilize previously developed materials as well as develop technical materials that highlight the specifications of BMPs in the NRCS FOTG (subtask 3.3).				
	<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:25%; text-align:center;">Start Date</td> <td style="width:25%; text-align:center;">Month 1</td> <td style="width:25%; text-align:center;">Completion Date</td> <td style="width:25%; text-align:center;">Month 48</td> </tr> </table>	Start Date	Month 1	Completion Date	Month 48
Start Date	Month 1	Completion Date	Month 48		
Subtask 3.6	AgriLife Extension will coordinate with SWCDs, NRCS, HRO, and cooperating producers to host field tours that demonstrate benefits of BMPs and WQMPs. At least 1 field tours will be held annually. Demonstrations will include the use of equipment to illustrate the efficacy of BMPs.				
	<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:25%; text-align:center;">Start Date</td> <td style="width:25%; text-align:center;">Month 1</td> <td style="width:25%; text-align:center;">Completion Date</td> <td style="width:25%; text-align:center;">Month 48</td> </tr> </table>	Start Date	Month 1	Completion Date	Month 48
Start Date	Month 1	Completion Date	Month 48		
Subtask 3.7	Educational program (Subtasks 3.4, 3.5, 3.6) effectiveness will be assessed using a post-evaluation at events. Evaluations will contain before and after scales for producers to rate their opinions about the program that will be used to assess their gain in knowledge and willingness to adopt.				
	<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:25%; text-align:center;">Start Date</td> <td style="width:25%; text-align:center;">Month 1</td> <td style="width:25%; text-align:center;">Completion Date</td> <td style="width:25%; text-align:center;">Month 48</td> </tr> </table>	Start Date	Month 1	Completion Date	Month 48
Start Date	Month 1	Completion Date	Month 48		
Subtask 3.8	The Extension Assistant will continue providing irrigation districts, drainage districts, and commodity organizations with educational material to encourage water quality discussions among entities. Further, the Extension Assistant will attempt to participate in at least 3 entities meetings annually to discuss the project.				
	<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:25%; text-align:center;">Start Date</td> <td style="width:25%; text-align:center;">Month 1</td> <td style="width:25%; text-align:center;">Completion Date</td> <td style="width:25%; text-align:center;">Month 48</td> </tr> </table>	Start Date	Month 1	Completion Date	Month 48
Start Date	Month 1	Completion Date	Month 48		
Subtask 3.9	The Extension Assistant will support, promote, and participate in at least one annual field day, demonstration, site tour, or education event sponsored by NRCS, HRO, and/or SWCDs for the Arroyo Colorado watershed, as appropriate.				
	<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:25%; text-align:center;">Start Date</td> <td style="width:25%; text-align:center;">Month 1</td> <td style="width:25%; text-align:center;">Completion Date</td> <td style="width:25%; text-align:center;">Month 48</td> </tr> </table>	Start Date	Month 1	Completion Date	Month 48
Start Date	Month 1	Completion Date	Month 48		

Deliverables	<ul style="list-style-type: none"> <li>• Direct mailing list</li> <li>• News releases</li> <li>• Promote soil testing campaign</li> <li>• BMP specifications and economics educational materials</li> <li>• Annual Irrigation Training Program curriculum and agenda</li> <li>• Additional educational materials (developed as appropriate)</li> <li>• Annual financial and technical assistance program agenda</li> <li>• Annual demonstration field tour agenda</li> <li>• Number of meeting attendees</li> <li>• Post-evaluations at educational events</li> <li>• Entity meeting agendas participated in</li> <li>• List of field days, demonstrations and other events participated in</li> </ul>
--------------	--

<b>Project Goals (Expand from Summary Page)</b>	
	<ul style="list-style-type: none"> <li>- Develop educational materials that focus on specifications of BMPs to reduce the complexity of BMPs and demonstrate compatibility with current operations</li> <li>- Educate agricultural producers on various aspects of irrigation to demonstrate the feasibility of adopting BMPs</li> <li>- Support and promote the adoption of BMPs through incentive programs by hosting annual cost-share update meetings and field tours to demonstrate the effectiveness of BMPs</li> <li>- Increase the number of BMPs that have been adopted through providing materials and other educational efforts</li> </ul>

<b>Measures of Success (Expand from Summary Page)</b>	
	<ul style="list-style-type: none"> <li>• Development of educational materials specifically addressing BMPs and incentive programs.</li> <li>• Number of producers reached through education programs.</li> <li>• Increase in the number of BMPs installed as a result of increased outreach and education through this project.</li> <li>• At least 900 producers (approximately 130 samples in year 1 and 400 samples in years 2 &amp; 3) will participate in the soil testing campaign</li> <li>• Evaluation of educational programs and producers likeliness to adopt practices</li> </ul>

**2012 Texas NPS Management Program Reference (Expand from Summary Page)**

**Components, Goals, and Objectives**

Component 1: Explicit short- and long-term goals, objectives ... that protect surface and groundwater.

- LTG 1: Focus NPS abatement efforts, implementation strategies, and available resources in watersheds identified as impacted by nonpoint source pollution
- LTG 2: Support the implementation of state, regional and local programs to prevent NPS pollution through assessment, implementation and education.
- LTG 3: Support the implementation of state, regional and local programs to reduce NPS pollution, such as implementation of strategies defined in... Watershed Protection Plans
- LTG 5: Develop partnerships, relationships, ... to facilitate collective, cooperative approaches to manage NPS pollution
- LTG 6: Increase overall public awareness of NPS issues and prevention activities
- STG 2: Implementation: Coordinate and administer the implementation of Watershed Protection Plans and other state, regional, and local plans/programs to reduce NPS pollution.
  - Objective D: Implement... Watershed Protection Plans developed to restore and maintain water quality in water bodies identified as impacted by nonpoint source pollution.
- STG 3: Education: Conduct education and technology transfer activities to help increase awareness of NPS pollution and prevent activities contributing to the degradation of water bodies, including aquifers, by NPS pollution
  - Objective A: Enhance existing outreach programs at the state, regional and local levels to maximize the effectiveness of NPS education
  - Objective B: Administer programs to educate citizens about water quality and their potential role in causing NPS pollution
  - Objective C: Where applicable, expedite development of technology transfer activities to be conducted upon completion of BMP implementation.
  - Objective D: Conduct outreach through the ...Texas Cooperative Extension, Soil and Water Conservation Districts, and others to facilitate broader participation and partnerships. Enable stakeholders and the public to participate in decision-making and provide a more complete understanding of water quality issues and how they relate to each citizen.
  - Objective F: Implement public outreach and education to maintain and restore water quality in waterbodies impacted by NPS pollution.

Component 2: Working partnerships and linkages to appropriate state, ..., regional and local entities, private sector groups and Federal agencies.

Component 3: Balanced approach that emphasizes both state-wide nonpoint source programs and on-the-ground management of individual watersheds.

**Estimated Load Reductions Expected (Only applicable to Implementation Project Type)**

While this project is implementing an integral part of the Arroyo Colorado WPP, expected load reductions cannot be quantified; however, loading reductions can be quantified through the adoption of BMPs that this project is promoting.

**EPA State Categorical Program Grants – Workplan Essential Elements  
 FY 2011-2015 EPA Strategic Plan Reference**

Strategic Plan Goal – Goal 2 Protecting America’s Waters

Strategic Plan Objective – Objective 2.2 Protect and Restore Watersheds and Aquatic Ecosystems



**Part III – Financial Information**

<b>Budget Summary</b>				
Federal	\$	316,911	% of total project	60%
Non-Federal	\$	209,747	% of total project (≥ 40%)	40%
Total	\$	526,658	Total	100%
Category		Federal	Non-Federal	Total
Personnel	\$	154,084	\$ 54,929	\$ 209,013
Fringe Benefits	\$	55,625	\$ 13,392	\$ 69,017
Travel	\$	21,201	\$ 0	\$ 21,201
Equipment	\$	0	\$ 0	\$ 0
Supplies	\$	6,146	\$ 0	\$ 6,146
Contractual	\$	16,432	\$ 23,906	\$ 40,338
Construction	\$	0	\$ 0	\$ 0
Other	\$	24,230	\$ 0	\$ 24,230
Total Direct Costs	\$	277,718	\$ 92,227	\$ 369,945
Indirect Costs	\$	39,193	\$ 29,989	\$ 69,182
Unrecovered IDC			\$ 87,531	\$ 87,531
Total Project Costs	\$	316,911	\$ 209,747	\$ 526,658

<b>Budget Justification (Federal)</b>		
<b>Category</b>	<b>Total Amount</b>	<b>Justification</b>
Personnel	\$ 154,084	<p>TWRI Director: \$205,400 @ 0.45 months (\$7,702)            TWRI Extension Assistant: \$41,000 @ 38.4263 months (\$131,290)            TWRI Program Manager: \$76,778 @ 0.705 months (\$4,511)            BAEN Research Associate: \$55,146 @ 1.83 months (\$8,438)            BAEN Post Doc: \$32,480 @ 0.792 months (\$2,143)</p> <p>*named positions are budgeted with a 3% annual pay increase in all years; TBD positions and graduate students are budgeted with a 3% pay increase in years after year 1            *(Salary estimates are based on average monthly percent effort for the entire contract. Actual percent effort may vary more or less than estimated between months; but in the aggregate, will not exceed total effort estimates for the entire project.)</p>
Fringe Benefits	\$ 55,625	<p>The fringe rate is calculated at 18% for faculty/staff and the insurance rate is \$647 per month.            (Fringe benefits estimates are based on salary estimates listed. Actual fringe benefits will vary between months coinciding with percent effort variations; but in the aggregate, will not exceed the overall estimated total.)</p>
Travel	\$ 21,201	<ul style="list-style-type: none"> <li>• TWRI Associate Director or Research Scientist Travel – 1 trip annually (\$500 annually for flight, \$46 per diem daily, \$77 per night lodging, \$90 for rental car (3 days, 2 nights)), \$8 Concur travel filing system fee annually – \$1,070 per trip; \$3,210 total</li> <li>• TWRI Dist 12 Extension Assistant – 1 trip annually (\$500 annually for flight, \$56 per diem daily, \$93 per night lodging, \$90 for rental car (3 days, 2 nights)), \$8 Concur travel filing system fee – \$1,132 per trip; \$3,396 total</li> <li>• State Extension vehicle mileage \$1,234 Annually (257 miles monthly, \$.40 per mile) – \$3,703 total</li> <li>• BAEN Associate Professor and Extension Specialist – 2 trips for 2 people, 3 days, 2 nights estimated at \$550 for flights, \$46 per diem daily, \$77 per night lodging, \$120 for rental car, \$8 Concur travel filing system fee per trip and \$38 for miscellaneous fees = \$4,142 total</li> <li>• BAEN Student Technician travel to annual meeting for 3 days, 2 nights: car rental (\$189), fuel (\$98), lodging (\$195), per diem (\$80) = \$562</li> <li>• BAEN Professor – 1 trip annually (\$500 annually for flight, \$46 per diem daily, \$77 per night lodging, \$90 for rental car (2 days, 1 nights)), \$8 Concur travel filing system fee annually – \$857 per trip; \$2,571 total</li> <li>• BAEN Weslaco Associate Professor and Technician travel to trainings and local meetings with farmers: transportation/mileage, lodging and per diem as needed at the state rates, Concur travel filing system fee (\$3,617 total)</li> </ul>
Equipment	\$ 0	N/A
Supplies	\$ 6,146	<p>TWRI Office Supplies and Printing (\$900)            TWRI District 12 Office Supplies and Printing (\$1,200)            BAEN Office Supplies and Printing (\$1,080)            TWRI fuel for rental car – (\$90)            TWRI Dist 12 fuel for rental car (\$90)            BAEN Associate Professor &amp; Extension Specialist fuel for rental car (\$120)            BAEN Professor fuel for rental car (\$153)            BAEN Weslaco solar radiation sensor &amp; data logger (\$2,513)</p>
Contractual*	\$ 16,432	Internal subcontract to Texas A&M AgriLife Extension Service / AGECE

Construction	\$ 0	N/A
Other	\$ 24,230	TWRI Soil Testing Campaign – \$10 per sample at 1,200 samples (\$12,000) TWRI Soil Sample Shipping (\$1,500) TWRI PSA Airtime (\$1,850) TWRI Postage (\$1,800) TWRI Dist 12 Facility Rental (\$2,280) TWRI Dist 12 printing (\$300) BAEN Printing (\$600) Training/workshop registrations (\$1,500) Communications services for news releases, development, editing and layout of other project materials (\$2,400)
Indirect	\$ 39,193	15% if Total Direct Costs

<b>Budget Justification (Non-Federal)</b>		
Category	Total Amount	Justification
Personnel	\$ 54,929	TWRI Director: \$205,400 @ 0.9 months (\$16,347) TWRI Associate Director: \$126,875 @ 0.9 months (\$9,599) BAEN Associate Professor and Extension Specialist: \$118,740 @ 0.4 months (\$3,781) BAEN Professor: \$140,407 @ 0.4 months (\$4,470) Cameron CEA: \$86,670 @ 1.3 months (\$9,657) BAEN Associate Professor Dist 12: \$91,528 @ 1.1 months (\$8,741) Willacy CEA: \$45,319 @ 0.6 months (\$2,334) *named positions are budgeted with a 3% annual pay increase in all years; TBD positions and graduate students are budgeted with a 3% pay increase in years after year 1 *(Salary estimates are based on average monthly percent effort for the entire contract. Actual percent effort may vary more or less than estimated between months; but in the aggregate, will not exceed total effort estimates for the entire project.)
Fringe Benefits	\$ 13,392	The fringe rate is calculated at 18% for faculty/staff and the insurance rate is \$647 per month. (Fringe benefits estimates are based on salary estimates listed. Actual fringe benefits will vary between months coinciding with percent effort variations; but in the aggregate, will not exceed the overall estimated total.)
Travel	\$ 0	N/A
Equipment	\$ 0	N/A
Supplies	\$ 0	N/A
Contractual*	\$ 23,906	Internal subcontract to Texas A&M AgriLife Extension Service / AGECE
Construction	\$ 0	N/A
Other	\$ 0	N/A
Indirect	\$ 117,520	48.5% TWRI/D12/BAEN AgriLife Research Modified Total Direct Costs of Match – \$52,969 MTDC * 0.485 (\$25,690) 28% AgriLife Extension (CEAs) Modified Total Direct Costs – \$15,353 MTDC * 0.28 (\$4,299)  33.5% TWRI/AgriLife Research Unrecovered IDC – Federal \$261,286 MTDC * 0.335 (\$87,531)

<b>Budget Justification (Federal) – AgriLife Extension / AGECE</b>		
Category	Total Amount	Justification
Personnel	\$ 6,009	Student Technician: \$12/hour @ 20 hours/week for 12 weeks (\$2,880) AGECE Research Assistant: \$60,000 @ 0.6 months (\$3,129) *named positions are budgeted with a 3% annual pay increase in all years; TBD positions and graduate students are budgeted with a 3% pay increase in years after year 1 *(Salary estimates are based on average monthly percent effort for the entire contract. Actual percent effort may vary more or less than estimated between months; but in the aggregate, will not exceed total effort estimates for the entire project.)
Fringe Benefits	\$ 1,256	The fringe rate is calculated at 18% for faculty/staff and the insurance rate is \$647 per month. The fringe rate for students is calculated at 10%. (Fringe benefits estimates are based on salary estimates listed. Actual fringe benefits will vary between months coinciding with percent effort variations; but in the aggregate, will not exceed the overall estimated total.)
Travel	\$ 3,933	AGECE Dist 12 Research Assistant - 1 trip annually (\$500 annually for flight, \$56 per diem daily, \$93 per night lodging, \$75 for rental car (4 days, 3 nights)), \$8 Concur travel filing system fee annually – \$1,311 per trip; \$3,933 total
Equipment	\$ 0	N/A
Supplies	\$ 91	AGECE Dist 12 Research Assistant fuel for rental car - \$31 in yr 1, \$30 in yr 2&3
Contractual*	\$ 0	N/A
Construction	\$ 0	N/A
Other	\$ 3,000	Dist 12 publication & printing costs \$1,000 annually
Indirect	\$ 2,143	15% if Total Direct Costs

<b>Budget Justification (Non-Federal) – AgriLife Extension / AGECE</b>		
Category	Total Amount	Justification
Personnel	\$ 13,923	AGECE Professor Extension Specialist: \$127,952 @ 1.2 months (\$13,923) *named positions are budgeted with a 3% annual pay increase in all years; TBD positions and graduate students are budgeted with a 3% pay increase in years after year 1 *(Salary estimates are based on average monthly percent effort for the entire contract. Actual percent effort may vary more or less than estimated between months; but in the aggregate, will not exceed total effort estimates for the entire project.)
Fringe Benefits	\$ 3,302	The fringe rate is calculated at 18% for faculty/staff and the insurance rate is \$647 per month. (Fringe benefits estimates are based on salary estimates listed. Actual fringe benefits will vary between months coinciding with percent effort variations; but in the aggregate, will not exceed the overall estimated total.)
Travel	\$ 0	N/A
Equipment	\$ 0	N/A
Supplies	\$ 0	N/A
Contractual*	\$ 0	N/A
Construction	\$ 0	N/A
Other	\$ 0	N/A
Indirect	\$ 6,681	28% AgriLife Extension Modified Total Direct Costs – \$17,225 MTDC * 0.28 (\$4,823)  13% AgriLife Extension Unrecovered IDC – Federal \$14,289 * .13 (\$1,858)

